UNIVERSITY COUNCIL
ACADEMIC PROGRAMS COMMITTEE
REPORT FOR INFORMATION

PRESENTED BY: Susan Detmer, chair, academic programs committee

DATE OF MEETING: June 18, 2020

SUBJECT: Bachelor of Science (Biomedical Science) in Interdisciplinary Biomedical Science

COUNCIL ACTION: For Information Only

SUMMARY:
Approval for new degree-level programs for which an approved template exists has been delegated to the academic program committee by University Council. The template for majors for the Bachelor of Science (Biomedical Science) program was approved at University Council in April 2020.

At its May 27, 2020 meeting, the academic programs committee approved the following motions:

- That the Academic Programs Committee approve the Bachelor of Science (Biomedical Science) in Interdisciplinary Biomedical Sciences program, effective May 2021.

Since 2018, the departments and programs in the biomedical sciences have been merged to create more robust and multidisciplinary programs. The new major in Interdisciplinary Biomedical Sciences is a collaboration between the departments to create a novel multi-disciplinary undergraduate program that will position students for careers in the biomedical sciences and health-related professions.

The new program will be attractive for students seeking entry into health-related professional programs, like Medicine, Pharmacy, and Dentistry, as it will focus on a greater breadth of learning across the biomedical disciplines.

The new program adheres to the program requirements outlined in the template for Bachelor of Science (Biomedical Science) programs.

ATTACHMENTS:
1. Proposal for Academic or Curricular change – Major in Interdisciplinary Biomedical Sciences
Proposal for Academic or Curricular Change

PROPOSAL IDENTIFICATION

Title of proposal: Major in Interdisciplinary Biomedical Sciences

Degree(s): Bachelor of Science

Field(s) of Specialization: Interdisciplinary Biomedical Sciences

Level(s) of Concentration: Honours, Four-year

Degree College: Arts & Science

Contact person(s) (name, telephone, fax, e-mail):

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Proposed date of implementation: May 2021
In 2018, the five biomedical science departments merged to form two departments (Anatomy, Physiology, and Pharmacology (APP) and Biochemistry, Microbiology, and Immunology (BMI)) of more robust structure and multi-disciplinary capacity. These departments now seek to collaborate towards the creation of a novel undergraduate program of Interdisciplinary Biomedical Sciences (ID BMSC) that will enable cutting-edge, multi-disciplinary training that position our students for careers in the biomedical sciences as well as health-related professions.

i) Program Objectives:

- provide learners with student-centric, multidisciplinary training.
- inspire and enable careers within a spectrum of science-based activities.
- develop skills that will serve them well in the workplace, namely critical thinking skills, communication (written and oral), collaboration and teamwork.
- provide students with a strong basis in the foundational sciences (anatomy, physiology and pharmacology) that are critical to success in studying health professional programs.
- provide a strong foundational basis in biomedical sciences and research skills as well as serve as an inspiration for those students considering graduate training.
- provide students with experiential learning opportunities.
- reflect modern priorities in biomedical science education.
- attract top-tier students, both nationally and internationally.
- bolster the research capacities of our faculty.
- enable enrollment growth for the U of S.

ii) Demand: On average, about 180 students enter the second year of the current biomedical science programs with about 800 students total in years 2-4 of the various biomedical sciences majors. These numbers have remained fairly steady for the last 6 years. Students who are seeking entry into health-related professional programs (like Medicine, Pharmacy, and Dentistry) are likely better served by a greater breadth, as opposed to depth, of biomedical science training within their undergraduate programs. As such, the Interdisciplinary Biomedical Sciences program is anticipated to be popular with a significant portion of our current students as well as to attract new students.

iii) Uniqueness: Many Canadian Universities, in particular those with Medical Schools, offer majors/degrees within the biomedical sciences. Further, many Canadian Universities have moved towards a multidisciplinary approach to biomedical science education. Several Canadian Universities have already adopted biomedical science structures which are similar to the program proposed here. These models show a shared priority for multidisciplinary training, including the introduction of Interdisciplinary Biomedical Sciences or Interdisciplinary Medical Science degrees that are similar in scope and philosophy to this proposal. The ID BMSC program is essential for us to compete with these schools, both for retention of local students as well as to attract students on national and international scales. When we are clearly part of this group, there is the opportunity to differentiate our program and campus by virtue of infrastructure strengths, including the Canadian Light Source (CLS), the Vaccine and Infectious Disease Organization-International Vaccine Centre (VIDO-InterVac), and the new Health Sciences building.

iv) Student Outcomes (employment or academic opportunities): Within this new major there is enhanced priority on multi-disciplinary training, critical thinking, and experiential learning with
the goal to inspire and enable careers within a spectrum of science-based activities as well as providing an educational foundation for entry in health-related professional colleges.

v) **Expertise of Sponsoring Unit:** Within the two newly merged biomedical science departments there is a wealth of collective expertise, and established courses, to serve as the foundation for an Interdisciplinary Biomedical Science program. Further, the ID BMSC program also introduces two new core courses in Epidemiology and Pathology, courses that will be enabled through partnerships within the Departments of Community Health and Epidemiology and Pathology.

vi) **Relationship to Strategic Plans of the College and University:** The proposed BMSC program reflects the strategic priorities of the University and participating Colleges. Specifically, the ID BMSC Program is a shining example of the University priority towards collaboration. This new major has tremendous potential to increase enrollment and additional efforts will be made to increase the number of Indigenous students. Finally, the ID BMSC Program enables University and College priorities for strengthening research capacity by implementing a strong biomedical science program that better stimulates graduate student and faculty research programs.

The ID BMSC major directly aligns with the strategic plans of the university and COM, in particular to strengthen research capacity and to grow a strong cohort of excellent learners/researchers who will enhance both health science professional and graduate programs. Our goal is to implement undergraduate majors that stimulate graduate student and faculty research programs. The ID BMSC program builds upon an existing infrastructure of classes so the introduction of the program can be achieved within current teaching assignments.

**Resources:**

Resources will be handled within the current budgets of the Biomedical Sciences Departments (Anatomy, Physiology, and Pharmacology; and Biochemistry, Microbiology and Immunology) in the College of Medicine.

See Multi-year Budget and Financial Analysis in the B.Sc. (BMSC) template proposal.

**Supporting documents:**

The Notice of Intent, letters of support from the Colleges, and response from the Planning and Priorities Committee of Council are included in the B.Sc. (BMSC) template proposal.
College Statement

From Gordon DesBrisay, Vice Dean Academic

I am pleased to confirm that the College of Arts and Science supports the creation of a new Bachelor of Science (Biomedical Science), Type M, template to be used for the Biochemistry, Microbiology, and Immunology; Biomedical Foundations; Biomedical Neuroscience; Cellular, Physiological, and Pharmacological Sciences; and (proposed) Interdisciplinary Biomedical Sciences majors.

The College of Arts and Science is working to provide innovative program options that meet student need and demand. The new, template will allow the link between the Biomedical Science programs to be more evident to those not familiar with these programs, and will allow these programs to implement admissions requirements which differ from those in place for the Bachelor of Science, Type C, programs.

The Academic Programs Committee (BSc) approved the proposals to create the Type M template and the Interdisciplinary Biomedical Sciences major on February 27, 2020, as did the College Faculty Council through remote voting held on March 19-20, 2020.
Program Description

Interdisciplinary Biomedical Sciences

The Departments of Anatomy, Physiology, and Pharmacology and Biochemistry, Microbiology, and Immunology offer a program that enables cutting-edge, multi-disciplinary training that positions graduates for careers in the biomedical sciences as well as health-related professions. This program includes necessary courses for students who wish to enter graduate studies in biomedical sciences and into health-related professional schools such as Medicine, Dentistry, Veterinary Medicine and Pharmacy.

The five B.Sc. degree programs listed below share a set of courses (the Biomedical Science Common Core) which are to be taken in years 1 & 2. These courses have been incorporated into the M1, M3, and M4 requirements.

Biochemistry, Microbiology & Immunology
Biomedical Foundations
Biomedical Neuroscience
Cellular, Physiological and Pharmacological Sciences
Interdisciplinary Biomedical Sciences

Major Average

The major average in Interdisciplinary Biomedical Sciences programs includes the grades earned in:

- All courses listed in the Core Requirement M4
- All courses listed in the Major Requirement M5.

Residency Requirements in the Major

To receive a degree in Interdisciplinary Biomedical Sciences, students must complete at least two-thirds of the following coursework (to the nearest highest multiple of 3 credit units) from the University of Saskatchewan.

- Minimum requirements in Core Requirement M4 and the Major Requirement M5.

See Residency for additional details.

Bachelor of Science (BMSC) Honours (B.Sc. (BMSC) Honours) – Interdisciplinary Biomedical Sciences

No more than 6 credit units from one subject may be used in Requirements M1 to M3.

M1 College Requirement (15 credit units)

English Language Writing
Choose 6 credit units from the following:

- Approved list
Indigenous Learning
Choose 3 credit units from the following:

- Approved list

Quantitative Reasoning
Choose 3 credit units from the following:

- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences

Choose 3 credit units from the following:

- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods

M2 Breadth Requirement (3 credit units)
Choose 3 credit units from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

M3 Cognate Requirement (21 credit units)

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

Required Cognate Courses

- PHIL 140.3 Critical Thinking

Choose 3 credit units from the following:

- HLST 110.3 Introduction to Health Studies
- PSY 120.3 Biological and Cognitive Bases of Psychology
- PSY 121.3 Social Clinical Cultural and Developmental Bases of Psychology
- SOC 111.3 Foundations in Sociology Society Structure Process
- SOC 112.3 Foundations in Sociology Social Construction of Everyday Life
M4 Core Requirement (24 credit units)

- **BMSC 200.3** Biomolecules
- **BMSC 207.3** Human Body Systems I
- **BMSC 208.3** Human Body Systems II
- **BMSC 210.3** Microbiology
- **BMSC 220.3** Cell Biology
- **BMSC 230.3** Metabolism
- **BMSC 240.3** Laboratory Techniques
- **CHEM 250.3** Introduction to Organic Chemistry

M5 Major Requirement (42 credit units)

- **BMSC 320.3** Nucleic Acids from Central Dogma to Human Disease
- BMSC 350.3 Introduction to Epidemiology
- CPPS 405.3 (Current Topics in Cellular Physiological and Pharmacological Sciences) or NEUR 405.3 Current Topics in Neuroscience
- CPPS 337.3 Evidence Based Medicine
- MCIM 321.3 Principles of Immunology
- PATH 205.3 Survey of Pathology
- PHPY 304.3 Pharmacology I

Choose 3 credit units from the following:

- **ACB 331.3** Methods in Cell and Developmental Biology
- **BIOC 310.3** Proteins and Enzymes
- **BMIS 340.3** Introduction to Experimental Molecular Biology
- **MCIM 390.3** Experimental Microbiology and Immunology
- **PHPY 308.3** Experimental Basis of Physiology and Pharmacology

Choose 6 credit units from the following:

- **BMIS 489.6** Research Project in Biochemistry Microbiology and Immunology
- **CPPS 432.6** Undergraduate Research Project in Cellular Physiological and Pharmacological Sciences
- **NEUR 432.6** Undergraduate Research Project in Neuroscience

Within the following requirements, at least 6 credit units must be at the 400-level:

Choose 6 credit units from the following:

- ACB 300-Level, 400-level
- CPPS 300-Level, 400-Level
- NEUR 300-Level, 400-level
- PHPY 300-Level, 400-level
Choose 6 credit units from the following:

- BIOC 300-Level, 400-level
- BMIS 300-Level, 400-level
- BMSC 300-Level, 400-level
- MCIM 300-Level, 400-level

**M6 Electives Requirement (15 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

Students are recommended to choose at least one of the following courses:

- BINF 200.3 Introduction to Bioinformatics
- BINF 210.3 Introduction to Bioinformatics Applications

**Bachelor of Science (BMSC) Four-year (B.Sc. (BMSC) Four-year) – Interdisciplinary Biomedical Sciences**

No more than 6 credit units from one subject may be used in Requirements C1 to C3.

**M1 College Requirement (15 credit units)**

**English Language Writing**
Choose 6 credit units from the following:

- Approved list

**Indigenous Learning**
Choose 3 credit units from the following:

- Approved list

**Quantitative Reasoning**
Choose 3 credit units from the following:

- MATH 110.3 Calculus I
- MATH 125.3 Mathematics for the Life Sciences

Choose 3 credit units from the following:

- STAT 245.3 Introduction to Statistical Methods
- STAT 246.3 Introduction to Biostatistics
- PLSC 214.3 Statistical Methods
M2 Breadth Requirement (3 credit units)

Choose 3 credit units from the following areas.

- Fine Arts
- Humanities
- Social Sciences
- Courses with No Program Type

M3 Cognate Requirement (21 credit units)

- BIOL 120.3 The Nature of Life
- CHEM 112.3 General Chemistry I Structure Bonding and Properties of Materials
- CHEM 115.3 General Chemistry II Chemical Processes
- PHYS 115.3 Physics and the Universe
- PHYS 117.3 Physics for the Life Sciences or PHYS 125.3 Physics and Technology

Required Cognate Courses

- PHIL 140.3 Critical Thinking

Choose 3 credit units from the following:

- HLST 110.3 Introduction to Health Studies
- PSY 120.3 Biological and Cognitive Bases of Psychology
- PSY 121.3 Social Clinical Cultural and Developmental Bases of Psychology
- SOC 111.3 Foundations in Sociology Society Structure Process
- SOC 112.3 Foundations in Sociology Social Construction of Everyday Life

M4 Core Requirement (24 credit units)

- BMSC 200.3 Biomolecules
- BMSC 207.3 Human Body Systems I
- BMSC 208.3 Human Body Systems II
- BMSC 210.3 Microbiology
- BMSC 220.3 Cell Biology
- BMSC 230.3 Metabolism
- BMSC 240.3 Laboratory Techniques
- CHEM 250.3 Introduction to Organic Chemistry

M5 Major Requirement (36 credit units)

- BMSC 320.3 Nucleic Acids from Central Dogma to Human Disease
- BMSC 350.3 Introduction to Epidemiology
- CPPS 405.3 (Current Topics in Cellular Physiological and Pharmacological Sciences) or NEUR 405.3 Current Topics in Neuroscience
- CPPS 337.3 Evidence Based Medicine
- MCIM 321.3 Principles of Immunology
- PATH 205.3 Survey of Pathology
- PHPY 304.3 Pharmacology I

Choose **3 credit units** from the following:

- [ACB 331.3](#) Methods in Cell and Developmental Biology
- [BIOC 310.3](#) Proteins and Enzymes
- BMIS 340.3 Introduction to Experimental Molecular Biology
- [MCIM 390.3](#) Experimental Microbiology and Immunology
- [PHPY 308.3](#) Experimental Basis of Physiology and Pharmacology

Within the following requirements, at least 6 credit units must be at the 400-level:

Choose **6 credit units** from the following:

- ACB 300-Level, 400-level
- CPPS 300-Level, 400-Level
- NEUR 300-Level, 400-level
- PHPY 300-Level, 400-level

Choose **6 credit units** from the following:

- BIOC 300-Level, 400-level
- BMIS 300-Level, 400-level
- BMSC 300-Level, 400-level
- MCIM 300-Level, 400-level

**M6 Electives Requirement (21 credit units)**

Arts and Science courses, or those from other Colleges that have been approved for Arts and Science credit, to complete the requirements for 120 credit unit Four-year program, of which at least 66 must be at the 200-level or higher.

Students are recommended to choose at least one of the following courses:

- [BINF 200.3](#) Introduction to Bioinformatics
- [BINF 210.3](#) Introduction to Bioinformatics Applications